

may, it is at least automatic, and must repeat itself in other similar circumstances.

There is, moreover, direct evidence in support of the above conclusions. Spectroscopic investigation has proved the presence of water vapor in the atmospheres of Mars, Venus, Jupiter, and Saturn, and nobody has suggested what the snowcaps of Mars may be unless they are real snow (hoarfrost) or, improbably, carbonic acid. Lowell and Arrhenius agree in considering them snowcaps.<sup>1</sup>

In the earth's atmosphere carbonic acid has been very largely converted into oxygen and vegetable matter, which later has been turned into enormous quantities of coal. It is, in fact, possible, in accordance with the suggestion of Koene, that all the oxygen of the atmosphere has been thus formed from carbon dioxide, and that therefore coal, peat, and other similar substances within the earth are chemically equivalent to the oxygen now free.

If a typical atmosphere must contain water and carbon dioxide, its evolution must obviously be in part conditioned by the presence of these substances. Hence terrestrial meteorology, no less than terrestrial geology, must be in greater or less degree a special case of a

<sup>1</sup> Arrhenius, "Kosmische Physik," p. 173; Lowell, "Mars as the Abode of Life," p. 81.